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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

MAY 22 1992

Federal Communications Commission
Office of the Secretary

In the Matter of

Amendment of Parts 2, 21, 25 and 94
of the Commission's Rules to
Accommodate Common Carrier
and Private Op-Fixed Microwave
Systems in Bands Above 3 GHz

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RM-_____

To: The Commission

PETITION FOR RULE MAKING

ALCATEL NETWORK SYSTEMS, INC.

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May 22, 1992

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To: The Commission

PETITION FOR RULE MAKING

Pursuant to Section 1.401 of the Commission's Rules, 47 C.F.R. Section 1.401 (1991), Alcatel Network Systems, Inc. ("ANS"), by its attorney, hereby petitions the Commission to amend Parts 2, 21, 25 and 94 of its Rules to accommodate common carrier and private-op fixed microwave systems in the bands above 3 GHz.

I. SUMMARY

This Petition for Rule Making ("Petition") is prompted by the Commission's Notice of Proposed Rule Making, 7 FCC Rcd 1542 (ET Docket No. 92-9) (1992) ("NPRM"), wherein it proposes to reallocate 220 MHz of spectrum between 1.85 and 2.20 GHz for emerging telecommunications technologies. To make room for these new technologies, the Commission, in the NPRM, proposes a phased-in migration of existing common carrier and private op-fixed 2 GHz microwave users to bands above 3 GHz and limits prospective fixed microwave users to operating at 2 GHz on a secondary basis.

ANS is concerned that the Commission is acting prematurely.¹ Fixed private and common carrier microwave users provide crucial telecommunications services for local exchange carriers, cellular telephone companies, utilities, railroads, petroleum companies, financial institutions, and other businesses. Their involuntary migration off the 2 GHz band would disrupt operations and could impede technological advances in services and equipment. Requirements for the potentially displaced common carrier and private op-fixed microwave users' low and medium capacity systems must be satisfied if they are relocated to the primarily high capacity bands above 3 GHz. Thus, the Commission must not require removal of fixed microwave users from the 2 GHz band until it adopts specific rules governing their provision of service in other bands that are compatible with current operations.²

Rules must be adopted to ensure efficient use of the spectrum. Such rules should include provision for co-primary use of all available bands by private op-fixed and common carriers, eligibility, band channelization, modulation efficiency standards and minimum channel loading requirements, minimum path length requirements, frequency coordination criteria, and antenna standards. However, in the NPRM, the Commission does not address the need to adopt such specific rules.

¹ ANS will detail these concerns in Comments on the NPRM.

² The Commissioners acknowledge the need for such a rulemaking. In their April 20, 1992, letter to Senator Ernest F. Hollings, the Commissioners state that they

will welcome particularly any additional proposals that might accommodate the competing demands for this important spectrum. Specifically, further notices of proposed rulemaking will be issued where necessary to address significant technical or operational issues raised in this docket....

To address the needs of common carrier and private op-fixed microwave users, ANS, in this Petition, proposes these necessary rules.³ If adopted, these rules would ensure the continued availability of critical fixed microwave services and would optimize spectral efficiency:⁴

1. Reallocation of the 3.6-3.7 GHz band, currently allocated on a shared basis to government use (aeronautical radionavigation and radiolocation on a primary basis) and to non-government use (fixed satellite downlink on a primary basis and radiolocation on a secondary basis), so that fixed point-to-point non-government service could be provided by private-op fixed and common carriers on a co-primary basis.

2. Reallocation of the point-to multipoint section of the 10.55 to 10.68 GHz band to permit point-to-point applications by both private-op fixed and common carriers on a co-primary basis.

3. Reallocation of the following bands to permit use by both private op-fixed and common carriers on a co-primary basis:

- 4 GHz (3.7-4.2 GHz).
- Lower 6 GHz (5.925-6.425 GHz).
- Upper 6 GHz (6.525-6.875 GHz).
- 11 GHz (10.7-11.7 GHz).

³ On March 31, 1992, the Utilities Telecommunications Council ("UTC") filed a Petition for Rule Making (RM-7981) ("UTC Petition") requesting deferral of action on the NPRM until the Commission proposes rules for fixed microwave user operation above 3 GHz. On April 10, 1992, the Association of American Railroads ("AAR"), Large Public Power Council and American Petroleum Institute jointly filed a Petition to Suspend Proceeding ("AAR Petition"), and on May 1, 1992, UTC filed a Petition for Issuance of Further Notice of Proposed Rulemaking ("UTC Further Petition"). Disparate comment periods for these proceedings have been or will be established. Comments on the NPRM are due June 5 and Reply Comments are due July 6, 1992. Comments on the UTC Petition are due June 1 and Reply Comments are due June 16, 1992. This pleading schedule will be complicated by comments on ANS' Petition. Consequently, on May 11, 1992, ANS filed a Request to Defer Comment Dates to establish a consolidated, and thus useful, pleading schedule for all these interrelated proceedings.

⁴ These proposals are detailed in Attachment 1 hereto.

4. Specific rule changes to Parts 2, 21, 25 and 94, which would:

- **effectuate such proposed reallocations;**
- **define eligibility;**
- **prescribe band channelization, minimum path lengths, minimum channel loading, and minimum capacity for bandwidth used;**
- **establish frequency coordination criteria; and**
- **establish antenna standards.**

ANS' proposed rules are grounded upon several factors:

First, ANS prefers that the status quo at 2 GHz be preserved. However, it recognizes that PCS and other emerging technologies are in the public interest and require spectrum.

Second, by proposing across-the-board sharing of the 3.6 to 3.7, 4, lower 6, upper 6, 10 and 11 GHz bands by common carrier and by private op-fixed microwave users on a co-primary-basis, both classes of users will have access to more spectrum than they have now. Common carriers would have access to an additional 350 MHz in the upper 6 GHz band and 100 MHz each in the 3.6 to 3.7 and the 10 GHz bands. Moreover, common carrier access to the 4 GHz and lower 6 GHz bands would be re-enfranchised because of ANS' eligibility and channelization proposals. Private op-fixed carriers would have access to an additional 2120 MHz of spectrum.⁵

Third, the pleas from 2 GHz users for low and medium capacity channels in the bands above 3 GHz must be answered. Methodical and precise development of specific channel plans to accommodate such potentially orphaned users is mandatory. Reliance upon industry groups to develop proposed channelization plans and then to forge a consensus on such plans would delay resolution of this reallocation process and could result in a balkanized, and thus dysfunctional, set of standards. It is imperative that the issue be joined now and the rules proposed herein be opened for full public comment.

⁵ **See Attachment 1, Section 3.1.**

Fourth, to serve the public interest and accommodate emerging technologies and fixed microwave users, incumbent users in the bands above 3 GHz must be required to make certain reasonable and equal sacrifices. Reallocation will be a long-term process (i.e., after this and related regulatory proceedings are resolved, there likely will be an additional 10-15 year transition period, as proposed by the Commission in the NPRM).⁹ Under these circumstances, incumbent licensees, such as satellite operators in the 4 GHz band, would be on notice and thus would be able to plan ahead regarding their future spectrum needs. Any changes to current spectrum assignments could take place on a phased-in basis, thereby minimizing disruption to or harmful impact upon existing licensees or their customers.

Fifth, use of microwave by common carriers is evolving. No longer is it the transmission medium of choice by common carriers for long-haul, high density transcontinental systems. With the advent of lightwave systems, common carriers primarily use microwave for less dense and shorter systems. This change diminishes the need to make large amounts of available spectrum channelized for high density systems. Consequently, a portion of these bands should be rechannelized to match current low or medium capacity needs.

Sixth, telecommunications services are increasingly global in nature. Spectrum allocations must be made so they are consistent with requirements in other countries. Consequently, the reallocations proposed herein are compatible with international conventions and requirements.

As demonstrated herein, and especially in Attachment 1, ANS' proposal will work. It makes available to private op-fixed and common carriers alike a "pool" of spectrum to share, on a co-primary basis, for provision of services. These carriers will have access to

⁹ NPRM, 7 FCC Rcd at 1545.

more spectrum than is currently available. Standards are being developed that will facilitate sharing of these bands. A critical component of this proposal is a channelization scheme that will serve the capacity and propagation needs for most displaced microwave users. Such agility optimizes effective use of scarce spectrum.

II. ANS IS WELL-SUITED TO MAKE THE PROPOSALS CONTAINED HEREIN

ANS is a wholly-owned subsidiary of Alcatel Alsthom ("Alcatel"), one of the world's largest corporations (with annual sales in excess of \$30 billion) and the world's largest manufacturer and supplier of telecommunications equipment. In particular, Alcatel is the world's largest independent manufacturer and supplier of microwave telecommunications equipment, such as the equipment used by the fixed users affected by the NPRM.

ANS was formed in 1991 following Alcatel's acquisition of Rockwell International Corporation's Network Transmission Systems Division, which, in turn, was a successor to the Collins Radio Company, a pioneer in the development and production of microwave and other radio equipment. This organization, which started with eight employees in 1933, now employs approximately 5000 people in the United States. It has manufacturing facilities in Richardson and in Longview, Texas, Raleigh, North Carolina, and Nogales, Mexico. These facilities contain over one million square feet of floor space devoted exclusively to the manufacture and test of digital lightwave and microwave radio transmission equipment. ANS has over \$500 million in annual sales.

ANS' expertise makes it well-suited to create, and advance before the Commission, the rules proposed herein. It is a world leader in manufacturing microwave and lightwave transmission systems. Its parent company also lends expertise as a leader in the provision of cables, networks for broadband and narrowband services, satellite earth stations, and myriad data communications equipment. ANS' equipment is used for a wide range of services, including short, medium and long-haul voice, video and data transmissions. Its

microwave customers include all the Bell Operating Companies, most major independent telephone companies, cellular operators, power and other utility companies, oil companies, railroads, industrial companies, and state and local government agencies.

ANS, with its Collins Radio and Rockwell International heritage, has more than 30 years experience as a leading U.S. supplier of turnkey telecommunications systems. This long and successful history at the forefront of radio technology includes the following:

- Providing the radio communication equipment for the Admiral Byrd expedition to the South Pole;
- Developing the first Class B radio modulation;
- Developing the first autotuning radio transmitters for nearly instantaneous frequency channel changes;
- Developing the first high frequency rotating direction finder;
- Developing the first weather radar system for a commercial television station;
- Providing the high frequency transmitters for the State Department's Voice of America broadcasts;
- Developing the first radio sextant;
- Providing the high frequency communications equipment for the U.S. Air Force Strategic Air Command;
- Providing the communication/navigation system for the X-15 rocket plane;
- Providing the first two-way radio voice communication via artificial satellite (Project Echo);
- Providing all radio communication equipment for manned orbital flights (Project Mercury and Project Gemini);
- Being, at one time, the largest independent producer of data modems (Kineplex);
- Being a pioneer in the field of Tropospheric microwave communication;
- Manufacturing the first all-solid-state microwave radio to use a fundamental frequency above 1 GHz;

- Obtaining the first FCC type acceptance for a common carrier microwave transmitter; and
- Introducing the first all digital microwave radio capable of 1344 channels on one polarization.

With this experience and expertise, it is understandable why ANS' predecessor's equipment was used on Project Apollo to transmit the voice of the first man on the moon.

III. IF FIXED MICROWAVE USERS ARE DISPLACED, SPECIFIC RULES GOVERNING THEIR OPERATION IN BANDS ABOVE 3 GHZ MUST BE ADOPTED

A. THE NPRM IS BASED UPON QUESTIONABLE ASSUMPTIONS

The Commission is caught in a regulatory bind. Emerging wireless radio technologies, especially personal communications services ("PCS"), need spectrum. Insufficient available spectrum exists to accommodate these new technologies. Consequently, the Commission proposes clearing out a portion of the 2 GHz band by migrating fixed microwave users to bands above 3 GHz.

While recognizing the cost that this reallocation might impose upon fixed microwave users, the Commission appears convinced that these licensees must be migrated off the 2 GHz band so it would be available for emerging technologies:

There are substantial operations on virtually all of the lower frequency bands, so that establishment of emerging technologies bands will unavoidably necessitate relocation of significant numbers of existing users. The task, then, is to identify a relatively wide band of frequencies that can be made available with a minimum of impact on existing users and that also can provide suitable operating characteristics for new, primarily mobile, services.⁷

⁷ NPRM, 7 FCC Rcd at 1543.

Identification of the candidate bands for the displaced fixed microwave users is based upon a Commission spectrum study:⁸

This study identified the most suitable region of the spectrum, determined the existing users of that spectrum, explored alternatives for relocating those users to higher bands or other media with a minimum disruption of service, and examined the cost of such relocation. The study concluded that 220 MHz in the 1.85-2.20 GHz region could be designated for innovative technologies and services.

* * * *

The study finds that the private and common carrier fixed microwave operations using the spectrum can be relocated to higher frequency bands that provide for similar type services and can support propagation over similar path lengths. Further, it observes that there are other reasonable alternatives for fixed microwave such as fibers, cable and satellite communications, which can utilize off-the-shelf equipment to provide these services.⁹

This proposed 2 GHz reallocation is based upon three (3) assumptions: (1) displaced fixed microwave users can operate at bands above 3 GHz under the "blanket waiver" without specific operating rules in place; (2) the bands above 3 GHz are appropriate because they have technical characteristics comparable to the 2 GHz band and they provide sufficient capacity to accommodate the displaced fixed microwave users; and (3) alternative media exist for displaced fixed microwave users, such as fiber, cable, and satellite. As demonstrated below, the validity of these assumptions is questionable.

Considering the potential impact that the proposed 2 GHz reallocation will have on an important class of telecommunications service providers -- the fixed microwave users -- these assumptions should not be used as the basis for decision-making of this magnitude. Unfortunately, the Commission paints an unfinished picture in the NPRM because it does

⁸ Creating New Technology Bands for Emerging Telecommunications Technology, Office of Engineering and Technology, OET/TS 91-1 (December 1991) ("OET Study").

⁹ NPRM, 7 FCC Rcd at 1543-44 (footnote omitted).

not provide the opportunity for a meaningful test of these assumptions to take place. Without specific proposed rules for fixed microwave operation in the bands above 3 GHz to evaluate, the public will be limited severely in their ability to determine if the 2 GHz reallocation would work. To ensure that this necessary evaluation occurs before fixed microwave users are displaced from the 2 GHz band, ANS completes the picture with the rules proposed herein.

B. THE COMMISSION PROPOSES A 'BLANKET' WAIVER FOR FIXED MICROWAVE OPERATION ABOVE 3 GHZ

To implement this migration of fixed microwave users off the 2 GHz band, the Commission proposes a

"blanket" waiver of the eligibility requirements in these bands for existing 2 GHz fixed microwave users. Specifically, we propose that all existing 2 GHz common carrier and private microwave operations be eligible for relocation to any of the higher frequency fixed microwave bands. The technical rules and coordination procedures currently applicable to each of the higher frequency bands, however, will apply. Existing 2 GHz fixed operations that relocate to the common carrier bands will be subject to the coordination procedures of Section 21.100 and 21.706, and those that relocate to private operational fixed bands will be subject to the coordination procedures of Section 94.63. We will encourage licensees moving from the 1.85-2.20 GHz band with path lengths of under 10 miles to reaccommodate their operations in frequency bands above 10 GHz to preserve the general availability of spectrum in the lower bands for longer path links not feasible at the higher frequencies.¹⁰

A transition plan is proposed to "reaccommodate the 2 GHz licensees in a manner that is the most advantageous for these existing users, least disruptive to the public and the most conducive to the introduction of new services."¹¹ This proposed transition plan

¹⁰ NPRM, 7 FCC Rcd at 1545 (citation omitted). In Attachment 1, Section 4.7, ANS proposes specific path length requirements for all bands reallocated to fixed microwave users.

¹¹ NPRM, 7 FCC Rcd at 1545.

involves: (a) immediately restricting applications for new fixed microwave facilities to secondary only use of the 2 GHz band; (b) allowing currently licensed 2 GHz fixed licensees to continue using the band on a co-primary basis for a fixed period of time (e.g., 10-15 years); and (3) permitting negotiation between existing users and new service operators for shared operation in the 2 GHz band and/or compensation for the displaced microwave user migrating to a band above 3 GHz.¹² However, the Commission, in the NPRM, does not address the technical parameters needed to make the transition from 2 GHz. Such necessary parameters have been identified and proposed herein.

C. THE OET STUDY DOES NOT ADDRESS SPECIFIC OPERATING REQUIREMENTS FOR FIXED USERS

Underlying the Commission's proposal to move fixed microwave users from the 2 GHz band to bands above 3 GHz is the OET Study. With respect to determining the technical feasibility of relocating the fixed microwave services operating in the 1.85-1.99 GHz, 2.11-2.15 GHz and 2.16-2.2 GHz bands to alternative bands above 3 GHz, OET examined spectrum: (1) that would be technically compatible (e.g., propagation and channel band-width) with existing 2 GHz systems; and (2) that would have sufficient spectrum capacity available to accommodate existing users.¹³

The OET Study, by its authors' admission, is limited in scope:

The methodology and analyses used in the study were intended to provide only broad measures of relocation capacity and were not designed to provide a relocation scheme for specific individual facilities.¹⁴

¹² NPRM, 7 FCC Rcd at 1545. In a Public Notice (mimeo. no. 23115, released May 14, 1992), the Commission clarified and relaxed the restriction regarding modifications.

¹³ OET Study, Section 4.1.

¹⁴ OET Study, Section 4.2.

Moreover, the "specific aspects of individual facility operations, such as actual channel bandwidths, were not considered."¹⁵

ANS applauds OET's efforts at initiating the process for determining if operation by fixed microwave users on bands above 3 GHz is possible. Nevertheless, given the inherent limitations in the OET Study, the Commission, in the NPRM, does not propose adoption of specific and acceptable rules for fixed microwave services in the bands above 3 GHz prior to requiring their involuntary migration. Other than proposing a "blanket" waiver so that displaced fixed microwave users could move to bands above 3 GHz, the Commission does not put forward any specific technical or operational rules governing how these users would provide service. There are no proposed rules regarding such critical matters as: (1) eligibility; (2) band channelization; (3) minimum channel loading, path lengths, and capacity for bandwidth used; (4) frequency modulation efficiency; (5) frequency coordination; and (6) antenna standards.

D. FIBER, SATELLITE AND CABLE MEDIA ARE NOT VIABLE ALTERNATIVES FOR FIXED MICROWAVE USERS

Availability of alternate media for displaced 2 GHz fixed microwave users is also an essential ingredient in the Commission's proposal. Based upon the OET Study, the Commission notes that "other reasonable alternatives for fixed microwave such as fiber, cable and satellite communications [are available], which can utilize off-the-shelf equipment to provide these services."¹⁶

Reliance upon these alternatives is unjustified. These media do not provide fixed microwave users adequate reliability of or control over system performance.

¹⁵ OET Study, note 19.

¹⁶ NPRM, 7 FCC Rcd at 1544.

If use of other facilities were viable, the facilities would have been leased from common carriers long ago. In fact, existing private users have their own microwave networks because they have a need for reliable, dependable communication. For utilities, public service companies, cellular telephone licensees and police departments, accumulated outage time of no more than a few minutes a year is tolerable. Such reliability only is practical over networks controlled by the user.

Fiber optic communication is impractical for two reasons. First, the systems are not reliable for critical users. When a fiber is cut, typical repair time is 8 to 12 hours. This is unacceptable. Most network topologies do not lend themselves to alternate routing as a means of avoiding this problem. Second, networks are not cost competitive. As OET notes, most 2 GHz paths are 17.3 miles long.¹⁷ Typical fiber system costs are \$40,000 per mile.¹⁸ Therefore, typical path replacement cost would be about \$700,000. A typical microwave path costs \$300,000.¹⁹ The arithmetic speaks for itself.

Satellite systems likewise are unusable. First, transmission bandwidth is not readily available. Most domestic satellites currently are used for video transmission. INTELSAT is the only major supplier of telephony bandwidth and the number of its terminals is limited in the United States. Second, satellite bandwidth is prohibitively expensive. A typical 10 MHz circuit is \$50,000 per month.²⁰ For a single microwave path, that would be \$600,000 a year (if the circuit were available in the first place). Again, the economics are highly unfavorable.

¹⁷ OET Study, Section 4.3.2.

¹⁸ OET Study, Section 5.0.

¹⁹ OET Study, Section 5.0.

²⁰ OET Study, note 42.

Of the three alternative media proposed by OET, cable is the least practical. Except for intra-building cabling and outside plant subscriber loops, this medium has been abandoned by virtually all telecommunications users. The reasons are obvious. Cable suffers all the cost disadvantages of fiber, except for the splicing and transmission electronics. The medium itself has inherently low capacity. This is a poor third choice to replace long distance microwave paths.

Clearly the use of alternate media is uneconomical at best and unacceptable or unavailable at worst. Thus, OET's assumption, that displaced 2 GHz microwave users could be accommodated by alternative media, is overly optimistic and should not be used to justify the proposed reallocation.

IV. ANS PROPOSES A VIABLE SOLUTION FOR DISPLACED FIXED MICROWAVE USERS

A. PROMPT ADOPTION OF A RULEMAKING PROPOSING SPECIFIC RULES FOR FIXED MICROWAVE USERS OPERATING ABOVE 3 GHz IS NECESSARY

In proposing a major "band clearing" at 2 GHz to move fixed microwave users, the Commission, in the NPRM, does not drop the other shoe. Specific rules for displaced fixed microwave users are not proposed. Instead, the Commission merely indicates its intention, at some unknown date and under some unknown regulatory framework, to make available fixed microwave bands above 3 GHz for the homeless 2 GHz users.

ANS supports the Commission's initiative in proposing allocation of spectrum for emerging PCS and other technologies. However, ANS opposes proceeding with this reallocation before the Commission fulfills its statutory obligation to "make available ... to all the people of the United States a rapid, efficient, Nation-wide, and world-wide wire and radio communication service"²¹ by ensuring that fixed users can continue providing their services. As UTC aptly states in its Petition, "It is incumbent upon the Commission to

²¹ 47 U.S.C. Section 151 (1992).

develop specific rules to accommodate both the technical, as well as the legal eligibility, requirements of any displaced 2 GHz systems....²²

B. ANS' PETITION PROPOSES NECESSARY SPECIFIC RULES FOR FIXED MICROWAVE USER OPERATION ON BANDS ABOVE 3 GHZ

Based upon its substantial experience in developing, manufacturing and installing microwave equipment, ANS has devoted considerable resources to solving the problem of what to do with the displaced microwave users. Its proposal, as detailed in Attachment 1, is a "win-win" for the Commission and the public, including the fixed microwave users.

1. ANS' proposed rules will facilitate migration of 2 GHz fixed microwave users to bands above 3 GHz.

If adopted, ANS' proposed rules will facilitate a graceful transition by fixed microwave users from the 2 GHz band to the bands above 3 GHz. ANS' proposal is distinguished by its spectral efficiency, its sensitivity to the displaced microwave users' needs and operations, and its expansion of the spectrum available for both common carrier and private op-fixed microwave users.

(a) **Spectral efficiency** -- ANS' proposal is spectrally efficient. It subdivides existing channels according to need. For the first time, fixed point-to-point microwave bands will be channelized according to the user's actual and anticipated requirements rather than according to the current criterion, which is whether it is a private op-fixed user or common carrier.²³

(b) **Sensitivity to displaced users' needs and operations** -- With its long history of manufacturing and servicing 2 GHz microwave equipment, ANS understands its users' needs. Its proposed band allocations, channelization plan, capacity requirements, and path length criteria all are defined to approximate current operations and to be consistent with

²² UTC Petition at 4.

²³ See Attachment 1, Sections 3.0 and 5.0.

modern engineering practice. In particular, the low and medium capacity requirements for common carrier and private op-fixed microwave users are directly provided for in ANS' proposed channelization plan.

(c) Increased spectrum -- ANS' proposal provides more spectrum for the displaced 2 GHz common carrier and private op-fixed microwave users. Although these users would lose their primary status in specific bands in favor of gaining co-primary status on all reallocated bands above 3 GHz, total available spectrum would increase. For the first time, common carriers would have access to the upper 6 GHz, 10.5 GHz and 3.6 to 3.7 GHz bands. An additional 510 MHz would be available to common carriers in these bands.²⁴ In addition, the 3.7-4.2 GHz and lower 6 GHz bands, which, due to interference and other problems caused by competing users, have been unavailable for common carrier microwave systems, would be accessible again for such use. Private op-fixed users would have access to an additional 2120 MHz of spectrum.²⁵

2. Criteria used by ANS to develop the proposed rules.

In developing this proposed reallocation, ANS' basic concept is to maximize spectrum efficiency without compromising current common carrier and private op-fixed microwave operations. Actual, rather than hypothetical, operating profiles, derived from a long history of working with major telecommunications operating companies, were used to formulate the proposed rules. Existing and anticipated equipment design, spectrum utilization requirements, and customer needs were analyzed.²⁶

²⁴ Under ANS' plan, there would be an additional 350 MHz available in the upper 6 GHz band, 100 GHz available in the 10.5 GHz band, and 100 MHz available in the 3.6 to 3.7 GHz band. However, common carriers would lose their existing 40 MHz in the 2 GHz band. See Attachment 1, Section 3.1.

²⁵ See Attachment 1, Section 3.1.

²⁶ See Attachment 1, Section 3.2.

The bands above 3 GHz primarily are channelized for high-capacity systems. However, the 2 GHz bands are populated mostly by low and medium capacity systems. Provision must be made in the bands above 3 GHz for the displaced low and medium capacity systems without wasting spectrum.

Proposing a "blanket" waiver and relying upon users to establish ad hoc channelization plans is unwise. An affirmative channelization plan must be established. Otherwise, chaos could result and efficient use of spectrum would be jeopardized.

Essential to development of these proposed rules was a thorough examination of appropriate frequency diversity limitations, antenna characteristics, minimum system loading, frequency band channel allocations, minimum path length requirements, frequency planning and coordination criteria, bandwidth limitations, power limitations, and automatic transmit power control. The reallocation and rechannelization rules proposed herein are based upon these specific operating criteria.²⁷

3. ANS' proposed frequency channelization plan.

(a) Co-primary sharing -- Available spectrum in the bands above 3 GHz is limited. These bands are gerrymandered so that only private op-fixed or common carriers have access to specific spectrum allocated to that class of carrier. With the proliferation of digital radios capable of operating on different frequency bands regardless of traffic characteristics, private op-fixed and common carriers will be able to share these bands on a co-primary basis.

Standards are being developed by industry groups that will facilitate this band sharing. ANS proposes application of the Part 21 frequency coordination standards for such co-primary use.²⁸

²⁷ See Attachment 1, Section 4.0.

²⁸ See Attachment 1, Section 4.8.

(b) Overall channelization plan -- As detailed below and in Attachment 1, ANS' proposal consists of both rechannellizing frequency bands and delineating technical considerations aimed at facilitating the movement of fixed point-to-point microwave users from the 2 GHz band.²⁹ ANS proposes reallocation and channelization of the 3.6 to 3.7 GHz Fixed Satellite allocation for fixed point-to-point use. This band still would be shared with the government. ANS proposes reallocation of the 10 and 11 GHz bands so private and common carriers could use them on a co-primary basis when system performance permits. ANS proposes reallocation and rechannellization of the 3.7 to 4.2 GHz (4 GHz) common carrier band so private and common carriers can use it on a co-primary basis for medium and low capacity traffic, in addition to the current high density channelization. Additionally, Alcatel offers a solution to the current difficulty in implementing point-to-point systems on the 4 GHz band due to interference with satellite receive stations. ANS proposes reallocation and rechannellization of the 5.925 to 6.425 (lower 6 GHz) common carrier band so private and common carriers may use it on a co-primary basis. ANS proposes reallocation and rechannellization of the 6.525 to 6.875 GHz (upper 6 GHz) private op-fixed band so private and common carriers could use it on a co-primary basis. Finally, ANS proposes additional specific amendments to Parts 2, 21, 25, and 94 to accommodate this reallocation. These amendments include provisions for eligibility, channel loading, minimum path lengths, modulation efficiency, and antenna standards.³⁰

(c) 4 GHz common carrier band -- The 3.7 to 4.2 GHz band is allocated for common carrier fixed and fixed-satellite (space-to-earth or downlink) use.³¹ This band is used primarily by licensed satellite and unlicensed receive-only earth stations. It was

²⁹ See Attachment 1, Section 3.0.

³⁰ See Attachment 1, Section 4.0.

³¹ 47 C.F.R. Section 2.106 (1991).

Identified by OET as one of the candidate bands for displaced 2 GHz fixed microwave users.³²

Fixed microwave operators also use this band on a co-primary basis with earth station users. Notwithstanding the microwave users' co-primary status, coordination with earth station users has been highly problematic and relatively ineffective.

To optimize efficient use of this 4 GHz band by microwave users, it must be rechannelized so that private op-fixed and common carriers could use it on a co-primary basis. Currently, the 4 GHz band is used only by high-capacity common carrier systems. However, upon adoption of ANS' rechannelization plan, low, medium, and high capacity systems could use this band simultaneously.³³

Specific preferred channel pairs and go/return channels are proposed. Over a 15 year transition period, 40 MHz at each band edge would be allocated on a primary basis for point-to-point microwave and on a secondary basis for satellite operation. This reallocation would promote favorable frequency coordination between the fixed microwave and earth station users on this band.

(d) Lower 6 GHz band – The 5.925 to 6.425 GHz common carrier band is allocated for fixed and fixed-satellite (earth-to-space or uplink) use.³⁴ This band is used primarily by specialized common carriers, local exchange carriers and cellular telephone companies. OET also identified the lower 6 GHz band as a candidate for the displaced 2 GHz fixed microwave users.³⁵

³² OET Study, Section 4.5.

³³ For a detailed description of how this band would be rechannelized, see Attachment 1, Section 3.3.

³⁴ 47 C.F.R. Section 2.106 (1991).

³⁵ OET Study, Section 4.5.

Reallocation of this band is necessary to permit co-primary use by private op-fixed and common carriers. Accommodation of these carriers requires a specific rechannellization scheme.³⁶

Under ANS' proposal, the eight 29.65 MHz channel pairs in this band would be converted to eight 30.00 MHz channels. This channelization would be consistent with all current domestic and foreign frequency plans. In addition, two frequency pairs would be used primarily for medium capacity traffic and six frequency pairs would be used for high capacity traffic. Low capacity traffic channelization also would be accommodated.

(e) Upper 6 GHz band -- The 6.525 to 6.875 GHz private op-fixed band is allocated for fixed and fixed satellite (earth-to-space) use.³⁷ This band is used primarily by private companies and state and local governments. It was selected by OET as a candidate for the displaced 2 GHz fixed microwave users.³⁸

ANS proposes reallocation and rechannellization of this band so private and common carriers could use it on a co-primary basis.³⁹ Existing 800 KHz channels at band edges would be subdivided into 400 KHz channels, and 5 MHz channels would be subdivided into 1.6 MHz channels.

(f) 3.6 to 3.7 GHz shared band -- The 4 and 6 GHz bands discussed above are allocated exclusively for non-government use. In contrast, the 3.6 to 3.7 GHz band is allocated on a shared basis for government and for non-government uses.⁴⁰ For

³⁶ For a detailed description of how this band would be rechannellized, see Attachment 1, Section 3.4.

³⁷ 47 C.F.R. Section 2.106 (1991).

³⁸ OET Study, Section 4.5.

³⁹ For a detailed description of how this band would be rechannellized, see Attachment 1, Section 3.5.

⁴⁰ 47 C.F.R. Section 2.106 (1991).

government use, this band is allocated for aeronautical radionavigation and radiolocation on a primary basis. For non-government use, this band is allocated for fixed satellite downlink service on a primary basis and radiolocation service on a secondary basis.

In developing its proposed rules, ANS assumes it is highly unlikely that the federal government would surrender any of its exclusive spectrum to accommodate private sector needs, especially for the services contemplated under the NPRM.⁴¹ However, given the coordination issues associated with the 3.7 to 4.2 GHz band discussed above, ANS proposes that the non-government 3.6 to 3.7 GHz band also be reallocated for fixed use.

Congestion in the non-government 3.6 to 3.7 GHz band is not a problem. This band is used by INTELSAT, which has a nominal number of earth stations deployed in the United States.⁴²

Since this band is shared with the government, coordination with NTIA is necessary. ANS understands that reallocation of the non-government 3.6 to 3.7 GHz band, consistent with future government needs, is a complicated matter. NTIA, however, is commencing various proceedings to open its allocation process and to identify its long-term spectrum needs.⁴³ The reallocation issues raised in the NPRM and herein will take many years to

⁴¹ AAR and UTC argue that federal government spectrum could be reallocated for emerging technologies and/or for relocating the displaced 2 GHz users. Specifically, these parties claim that the 1710-1850 MHz and 2200-2290 MHz federal government spectrum bands are available for such reallocation. AAR Petition at Section III; UTC Petition at 15-19.

⁴² The International Telecommunications Union and Canada have authorized this band for fixed terrestrial use.

⁴³ In its February 1991 study, U.S. Spectrum Management Policy: Agenda for the Future, NTIA instituted a spectrum management openness program. One of the goals adopted by NTIA in this study is:

NTIA will consider the needs of the private sector in developing Federal spectrum management policies to help create an environment in which spectrum is available to satisfy the spectrum needs of the United States.

resolve and implement. This time frame is consistent with NTIA's anticipated time frame for determining its spectrum needs and is consistent with the time frame when the 3.6 to 3.7 GHz non-government band would be needed for fixed microwave use. In this context, it is appropriate now to initiate public consideration of reallocating the non-government 3.6 to 3.7 GHz band to such fixed use as one option for the displaced 2 GHz users.

ANS proposes that the non-government 3.6 to 3.7 GHz band be reallocated to fixed point-to-point use for common carrier and private op-fixed users on a co-primary basis.⁴⁴ This band could be shared by government and non-government users, as the 23 GHz band is today.

The channelization plan for the 3.6 to 3.7 GHz band is similar to ANS' plan for its 4 and lower 6 GHz bands. This plan provides RF bandwidths from 400 KHz to 10 MHz, which is similar to the other channelization plans proposed herein and which accommodates the needs of low, medium and high capacity users.

Reallocation of the 3.6 to 3.7 GHz band would avoid the satellite coordination requirements in the 3.7 to 4.2 GHz band. Moreover, this band has propagation characteristics which are comparable to the 2 GHz band.

(g) 10 GHz common carrier band -- The 10.550 to 10.680 GHz common carrier band is allocated for digital electronic message service ("DEMS") point-to-multipoint use and point-to-point microwave use.⁴⁵ Even though many licenses were issued when DEMS initially was established, few systems actually have been installed. Thus, the point-to-multipoint segment of this 10 GHz band is relatively vacant.

⁴⁴ For a detailed description of how this band would be rechannelized, see Attachment 1, Section 3.6.

⁴⁵ 47 C.F.R. Section 2.106 (1991).

Under ANS' proposal, the current point-to-point channels would remain unchanged.⁴⁶ The point-to-multipoint section of the band would be divided into eight pairs of 5 MHz channels, twenty pairs of 2.5 MHz channels, and thirty pairs of 1.6 MHz sub-channels for medium capacity traffic. Part of this band also would be used for low capacity traffic using 800 and 400 KHz bandwidths.

The 10 GHz band is useful on short paths in urban areas where frequency congestion is a problem (i.e., less than 10 miles). However, since it is affected by rain outage, 10 GHz is not used on long paths or on paths requiring high reliability. In these applications, the lower frequency bands are preferred. Thus, the path length requirements for this band will remain unchanged.

To exploit the availability of this band, ANS proposes reallocating the point-to-multipoint section of the band for point-to-point services. This band then would be available as a "safety valve" if spectrum in the reallocated 4 and 6 GHz bands discussed above is inadequate.

(h) 11 GHz band -- The 11 GHz band is allocated for common carrier use.⁴⁷ This band primarily is used by specialized common carriers, local exchange carriers and cellular telephone companies.

Like the 10 GHz band, the 11 GHz band would be used by the displaced 2 GHz licensees if spectrum in the 4 and 6 GHz bands is inadequate. To make the 11 GHz band available to common carrier and private op-fixed users on a co-primary basis, channel bandwidths of 10 and 30 MHz are proposed.⁴⁸ The 10 MHz channels are needed for low

⁴⁶ For a detailed description of how this band would be rechannelized, see Attachment 1, Section 3.7.

⁴⁷ 47 C.F.R. Section 2.106 (1991).

⁴⁸ For a detailed description of how this band would be rechannelized, see Attachment 1, Section 3.8.